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lowish, curved, continuous, $9-12 \times 2\mu$. The perithecia have thick walls, which are pale olivaceous at first, and at length black. On dead elm branches. Decorah, Iowa, Sept., 1882. E. W. Holway, No. 266.—*J. B. Ellis, Newfield, N. Y.*

ENTOMOLOGY.¹

MISTAKEN INSTINCT IN A BUTTERFLY.—I believe I have an instance in illustration of your remark in the *NATURALIST* for July, 1882, that "the sense of sight, touch and taste play a more important part in insect economy than the sense of smell."

In June I observed that a plant of *Artemisia ludoviciana* in our garden was covered with the hollow, spherical, leafy retreats of the larvæ of *Pyrameis huntera*. Never before having found this caterpillar on any plant except *Antennaria*, I thought that the very different qualities of the new food might possibly produce some variation in the butterfly, and so transferred a dozen or more of the skeletonized coverts to the rearing cage.

In so doing, I noticed that the larvæ seemed very small in proportion to the quantity of foliage gnawed. In the cage, although constantly supplied with fresh food and light and air, they did not thrive, and lingered along from day to day without any perceptible growth. Nor did those left on the plant in the garden develop much more satisfactorily, and one after another disappeared long before attaining full size. Of those in confinement but two succeeded in passing the third molt, and all died in about two weeks, from lingering starvation, except a couple that I transferred to *Antennaria*, which began at once to feed with avidity and soon completed their transformations.

As a rule, we can depend upon the botanical determinations of insects. I have repeatedly had the species of a plant, about which I was in doubt, decided for me by the peculiar gall or mine, which it bore, and which I knew to occur only on a certain species. In this case, however, the instinct of the parent butterfly was evidently at fault.

Antennaria being rather rare in this immediate locality, she was misled by the surface resemblance of the white, cottony leaves of the *Artemisia* to those of the accustomed food-plant of her young, and under this misapprehension deposited her eggs in utter disregard of the somewhat pungent odor, which a keen sense of smell would have perceived.

The young, upon hatching, attempted to feed, but found in the dry, bitter leaves of the *Artemisia* no adequate substitute for the bland, mucilaginous *Antennaria*, and, although they did not immediately die from its effects, were unable long to resist them.—*Mary E. Murtfeldt, Kirkwood, Mo.*

¹ This department is edited by Professor C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.

OBSERVATIONS ON THE FERTILIZATION OF *YUCCA* AND ON STRUCTURAL AND ANATOMICAL PECULIARITIES IN *PRONUBA* AND *PRODOXUS*.¹—This paper records some recent experiments and observations which establish fully and conclusively the fact that *Pronuba* is necessary to the fertilization of the capsular *Yuccas*. It describes for the first time how the pollen is gathered and collected by the female *Pronuba*. The act is as deliberate and wonderful as that of pollination. Going to the top of the stamen she stretches her tentacles to the utmost on the opposite side of the anther, presses the head down upon the pollen and scrapes it together by a horizontal motion of her maxillæ. The head is then raised and the front legs are used to shape the grains into a pellet, the tentacles coiling and uncoiling meanwhile. She thus goes from one anther to another until she has a sufficiency.

My observations confirm the accuracy of Dr. Geo. Engelmann's conclusion as to the impotence of the stigmatic apices in some of the *Yuccas*, and show how the apparently contradictory experience of Mr. Meehan can be reconciled on variation in this respect in the species of the same genus.

The exceptional self-fertilization in *Yucca aloifolia*—the only species in which it is recorded—is shown to be due to the fact that in the fruit of these species there is no style, the stigma being sessile, and the nectar abundant, filling and even bulging out of the shallow opening or tube. The flowers are always pendulous and the pollen falling from anthers can, under favorable circumstances, readily lodge on the nectar.

The irregularity in the shape of the fruit of the *Yuccas*—considered a characteristic by botanists—is proved by experiment to be due to the punctures of *Pronuba*.

The egg of *Pronuba*, which averages 1.5^{mm} long, having a swollen apical end, and a long and variable pedicel, is passed into the ovarian cavity of the fruit. The puncture is made usually just below the middle of the pistil on the deeper depression which marks the true dissepiment, or through the thinnest part of the wall. The horny part of the ovipositor reaches the longitudinal cavity at the external base of the ovule near the funiculus, without, as a rule, penetrating or touching the ovule itself; and the delicate and extensile oviduct then conveys the egg for some distance (the length of six or eight seeds) along the cavity, the terminal portion of the oviduct being furnished with retrorse hairs which help to hold it in place during the act.

The paper concludes with some studies of the internal anatomy of *Pronuba* and *Prodoxus*.

NATURAL SUGARING.—Lepidopterists have long found sugaring, *i. e.*, the besmearing of tree trunks with various, more or less intoxicating, sweets one of the best means of obtaining night-fly-

¹ Abstract of a paper, by Professor C. V. Riley, read at the Montreal Meeting of the A. A. A. S.

ing moths, but we do not recollect of seeing any record of what may be called natural sugaring. The year 1882 has been remarkable for the excessive abundance of a yet undescribed species of *Lachnus*, which we have called *Lachnus platanicola*, infesting the sycamore. We have received accounts of its excessive abundance from widely different sections of the country, as far north as Michigan and as far southwest as Missouri; while on trees in the grounds of the Department of Agriculture, it has prevailed to such an extent that whole trees, including leaves, branches and trunks, were heavily blackened by the growth of the fungus (*Fumago salicina*)¹ which developed on the saccharine exudations from the *Lachnus*. Hosts of sweet-loving insects, including all sorts of Hymenoptera during the day and chiefly Lepidoptera at night, were attracted to the trees which even excelled those artificially sugared as collecting ground for various Noctuids. The brilliant and glistening eyes of these moths, thickly settled upon all parts of the trees, gave these at night the appearance of being studded with gems, and produced an effect rarely witnessed, we imagine, by entomologists.

The comparatively sudden and excessive increase of a given species, as in this instance, over a wide extent of territory, is always remarkable and somewhat difficult to explain. We have observed that the conditions which permit such undue increase are often widely prevalent, and that species about the life-history of which little or nothing was previously known, are often studied by observers in different parts of the country during one and the same year.

The average expanse of the winged male of *Lachnus platanicola* is 14^{mm}, and length of body 4.5^{mm}. It bears a close resemblance to *L. longistigma* Monell, but is at once distinguished, among other differences, by its smaller size, paler wings and paler stigma. The apterous, oviparous, or true female has an average length of 8^{mm}. The eggs are about 2^{mm} long, elongate-ovoid, highly polished and sticky, orange-brown when first laid, but changing through olive-green to dark brown and finally almost to black. They covered the branches on the under side so thickly as to attract a host of different predatory insects which often cleared the branches with a regularity that was astonishing. —C. V. Riley.

EPILACHNA CORRUPTA AS AN INJURIOUS INSECT.—The plant-feeding habits of our common *Epilachna borealis* are well known, but nothing has hitherto been recorded of the food-habits of its Western congener, which, originally described by Mulsant from Mexico, extends to Colorado and Western Kansas. The very first notice we receive of the habits of this species shows that it is

¹ *Capnodium citri*, etc. See W. G. Farlow, on Diseases of Olive and Orange trees. *Bulletin Bussey Inst.* and *Monthly Microscopical Journal*, 1876.

capable of doing serious injury, as will be seen from the following letter of Professor Geo. H. Stone, Colorado Springs, Col., dated Aug. 26th, and accompanied by numerous specimens of *Epilachna corrupta*:

"By this mail I send you a tin box containing larvæ and perfect beetles which promise to have almost as unenviable a reputation as *Doryphora 10-lineata*. From the egg to the grave they are voracious. They are good judges of food. With me they have confined their attacks to black wax beans, and the enclosed leaves and pods will show their mode of attack. The early broods ate nearly all kinds of vegetables in a neighboring garden. They are rapidly spreading in the vicinity. I judge there are two or three broods in the year, like *Doryphora*. The adult beetles are not quite so active as their ten-lined relatives, however. They do not drop when the plant is shaken quite so readily as the potato-beetle. I have had but little chance to study them, as they only appeared in my garden a few days ago. Within that time they have eaten almost every leaf on a good-sized patch of wax beans, and to-day I have made arrangements to have them all picked by hand so they shall not have a chance to hibernate."

SPREAD OF THE TWELVE-PUNCTURED ASPARAGUS BEETLE.—Mr. Otto Lugger of Baltimore, Md., has already recorded the recent introduction from Europe of a second asparagus beetle, the *Crioceris 12-punctata* Linn., which in Europe occurs commonly wherever asparagus is cultivated, without, however, doing serious injury. Mr. Lugger found it first in the summer of 1881 near Baltimore in small numbers and quite local, but it has recently proved even more troublesome than *C. asparagi*. From the latter species this new enemy may at once be distinguished by its less elongate form and by the bright orange-red of the upper surface, each elytron being marked with six small black dots.

TROGODERMA TARSALE AS A MUSEUM PEST.—Professor F. H. Snow publishes in *Psyche* (Vol. iii, No. 98) careful descriptions of the larva and pupa of this beetle so destructive to our insect collections. It is in fact the most common museum pest in this country, and it is strange that Dr. Hagen in his paper on Museum pests does not mention it. It is by no means peculiar to the West as Professor Snow seems to suppose. Here in Washington it is by far the most dangerous enemy to insect collections, and much more frequent than *Anthrenus varius*. In the field its larva is occasionally found in the cracks of hollow trees and similar situations, feeding on dead insects, but it is far more common in the deserted cells of *Pelopæus*, *Odynerus*, *Anthophora* and other Hymenoptera that store their cells with spiders or other insects.

PHYLLOXERA IN CALIFORNIA.—In a report made by Mr. John H. Wheeler, Secretary of the Viticultural Commission of California,

on the result of the examinations made by the commission we find the following facts clearly set forth :

1. In California, as elsewhere, *Phylloxera vastatrix* hibernates in the apterous female state on the roots ; 2. The winter egg, if it exists at all, is as in the Eastern States, extremely rare on the wood above ground. Mention is made of finding occasionally dead bodies of females covering well developed eggs, and it is quite probable that these are the impregnated eggs produced by hypogean stem-mothers. It appears that the insect in California is most injurious in moist soils. In this respect, and this only, the experience on the Pacific coast seems to differ from ours on the Atlantic, for with us where normally there is an abundance of moisture the Phylloxera thrives best during dry summers. The opposite result in California is doubtless due to the fact that the conditions are there reversed.

HEARING IN INSECTS.—The sense of hearing in insects has been recently studied by Herr Gruber. He found the cockroach (*Blatta germanica*) very sensitive. On sounding a violin note when a cockroach was running across the floor, the creature always suddenly stopped. Again, a number of these cockroaches were enclosed in a glass vessel, and on making a strong sound there was evident agitation and excitement ; some would fall down from the glass as if paralyzed. A cockroach was hung by a thread from its hind leg ; when it was quiet a bow was drawn sharply over the violin strings at the distance of about four feet, whereupon the insect was greatly excited, and struggled round, getting its head uppermost. Beetles also were readily affected by sounds, but grubs and ants gave no certain indications. Of aquatic insects various kinds of *Corixa* were tried. These would often remain quite quiet for several minutes, but on tapping the glass with a glass tube they rushed about in much agitation. A disk at the end of a long rod drawn to and fro in the water near a quiet *Corixa* produced no effect, but on conducting the sound of a struck bell into the liquid by the rod, there was lively reaction ; similarly when a glass bell stroked with a bow, was brought to touch the water. These creatures were also sensitive to high violin notes in air, to the sound of a metal plate struck with a hammer, &c. Still more sensitive to sound were various aquatic beetles (*Laccophilus*, *Laccobius*, *Nepa cinerea*, &c.). On the other hand various larvæ, especially of Ephemerides, were unaffected ; but these were sensitive to mechanical agitation of the water. Herr Gruber considers the response made to sound an indication of true hearing, and not mere reflex action.—*English Mechanic*.

ZOÖLOGY.

PROPAGATION OF SPONGE BY CUTTINGS.—The Journal of the Society of Arts contains an abstract of an account given by Dr. E. V. Marenzeller of the efforts made by the Austrian government